

# Wireless, Low Mass, High Sensitivity Sensing Sheet for Structural Sensing and Long Term Analysis, Phase I

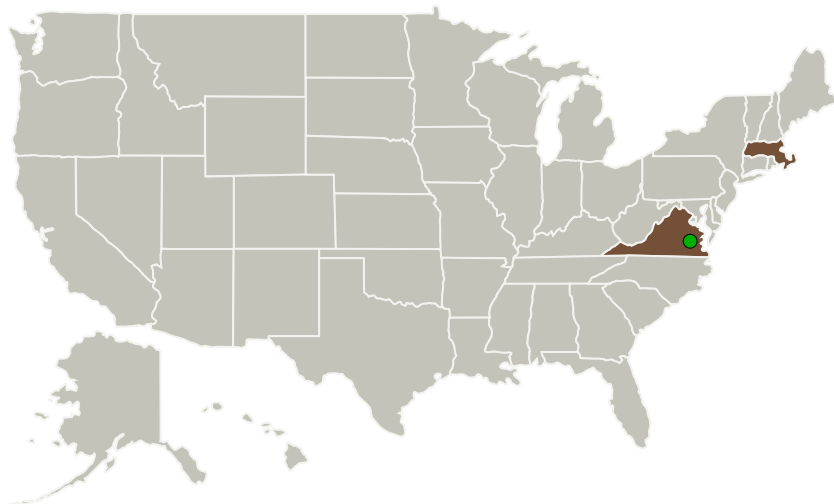
Completed Technology Project (2011 - 2011)



## Project Introduction

NASA needs sensor systems to inspect space structures with minimum human interaction. These systems must be highly integrated and self-sufficient, low mass, simple to operate, provide reliable information, and use little command processing power. Eddy current testing (ECT) is a widely practiced and critically important nondestructive evaluation (NDE) method used in aerospace, yet it relies on decades-old wire-coil sensors and scanning. RMD, in collaboration with Wyle Laboratories, proposes a revolutionary structural imaging and NDE technology based on a permanently affixed, flexible sheet containing a two-dimensional array of microscopic, directionally sensitive, solid-state eddy current sensors. The modular sensing sheet could be added to the spacecraft while in space or before launch. The sensing sheet will be thin (approximately 100  $\mu\text{m}$  thick) and highly flexible so that it can be mounted on curved surfaces. Energy independent, wireless arrays could be affixed underneath thermal insulation, paint or other coatings, and images created by a CPU integrated on the sensor array. These images permit structural assessment and NDE of many components throughout the lifetime of a mission. The system will be largely independent of the command computer and power systems, have little external wiring, and require almost no human attention.

## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Radiation Monitoring Devices, Inc.	Lead Organization	Industry	Watertown, Massachusetts
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Massachusetts	Virginia

## Project Transitions

▶ **February 2011:** Project Start

✓ **September 2011:** Closed out

## Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138576>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

Radiation Monitoring Devices, Inc.

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

Carlos Torrez

## Principal Investigator:

Timothy Tiernan

## Co-Investigator:

Timothy Tiernan

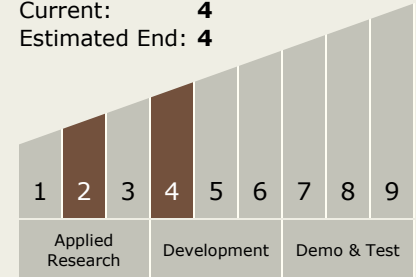
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## Technology Maturity (TRL)

Start: **2**  
Current: **4**  
Estimated End: **4**



## Technology Areas

### Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - └ TX12.4 Manufacturing
    - └ TX12.4.5 Nondestructive Evaluation and Sensors

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System